logy, and mineralogy so far back as 1827, and among the naturalists who taught one or other of the subjects before the new section was created were Hébert, Lory, Fouqué, Van Tieghém, Dastre, Perriér, Cornu, Giard, Le Monnier, and Bonnier. The feature of the instruction now given is the large attention paid to field work. Frequent geological, botanical and zoological excursions are made under the charge of the professors, both during the school year and the holidays. At the marine biological stations, holiday courses are always offered. Owing to the labours of Prof. de Lacaze-Duthiers, biological laboratories have been established at various points on the French coast. Since 1881, many students of the Normal School have worked at the stations at Roscoff, Banyuls, Concarneau, Wimereux, and Saint-Waast, and the knowledge they have thus gained from nature herself is far in advance of that received through lectures or from books.

Pasteur's connection with the school has a melancholy interest at the present time. Before he left the Faculty of Sciences at Lille, to become administrator and director of studies, he had made his important researches on the tartrates of soda and ammonia, and had commenced the study of fermentation. He therefore wanted a laboratory in which to continue his researches, but the school could not at the time offer him one. After a little difficulty, one small room, about ten feet square, was obtained, and in that restricted space he made some of his most valuable discoveries. This accommodation however, was gradually increased. In 1862 a large room was expressly constructed for Pasteur's work, and was added to from time to time as the value of the researches carried on came to be recognised. Finally, it was impossible for him to carry on his extensive researches under the hospitable roof in the rue d'Ulm, and he had to remove to a larger building. A few years later his work for science and humanity was recognised by the construction, at a cost of more than £100,000, raised by international subscription, of the Pasteur Institute in Paris, where the results of his researches are daily applied, and where the remains of the great investigator will finally rest.

The valuable *Annales dÉcole Normale* owe their commencement to M. Pasteur. The journal was first issued in 1864, and many important memoirs by members of the teaching staff, and by students, have appeared in it. Pasteur was editor from 1864 to 1870, and was succeeded by Henri Deville, who held the position until 1881, though the publication must have entailed pecuniary loss. Finally, the *Annales* were placed upon a firm footing by M. Zevort, Director of Secondary Education, who twelve years ago increased the subscription list by providing for the introduction of the journal into a number of *lycées*, and since then the assistance thus rendered has been continued by succeeding Directors of Higher and Secondary Education. M. Debray held the editorship of the *Annales* from 1882 to 1888, and M. Hermite now edits it, with an editorial committee comprising many of the most eminent men of science in France.

Many other names, in addition to those already mentioned, have contributed to the glory of the school. The work of Galois, for instance, whose short life ended in 1832, while still a student at the school, has had great influence upon the development of mathematics.

In the early part of this century, little attention was paid to astronomy at the Normal School. The mathematicians there produced a number of important memoirs on celestial mechanics, and made astronomical tables, but practical astronomy was entirely neglected. When Le Verrier became director of the Paris Observatory, he obtained permission for a limited number of students to work at the Observatory while still retaining their position in the school. Victor Puiseux and Paul Desains were the two first students selected, and they were succeeded by Paul Serret and Marié-Davy. Le Verrier thus opened a new career for students at the school, and the way they availed themselves of it is shown by the fact, that, in 1866, there were as many as fifteen of them upon the Observatory staff. Among the names of astronomers who were students at the school, are MM. Tisserand, Rayet, André, Angot, Stéphan, Simon, and Voigt; and at one time or another the school has provided directors for all the State observatories in France.

What more need be said? The names and works of the school's alumni are known and honoured throughout the scientific world, and that is sufficient testimony to the character of the instruction. The French Government is generous in its treatment of the school, but the expenditure is returned increased a hundredfold through the works of the students. And not only do these works benefit the Republic; they have an international value. Therefore the centenary which the school celebrated this year, interests all who are concerned with the advancement of natural knowledge.

R. A. Gregory.

THE "GEMMI" DISASTER.

A MONTH ago, the Swiss newspapers were full of various accounts of a destructive avalanche which took place at the Gemmi on September 11, at 4 a.m. The first report read as follows: "A large part of the Altels glacier got loose and slipped down, covering three kilometres of ground on the Spital Alp, two hours' walk above Kandersteg. Men (6) and cattle (300) have been killed by the slipped mass. The break across the glacier may be seen from the valley with the naked eye. Help has been sent up from the villages of Leuk, Kandersteg, and Frutigen." (*Allg. Schw. Ztg.*, September 12.) More correct details afterwards decreased the loss of cattle by about one half, and the whole damage is estimated at from 60,000 to 80,000 francs.

The part concerned will be perfectly familiar to many English travellers. Few foot-tourists in Switzerland miss the Pass of the Gemmi, which bridges the beautiful limestone mountains between Canton Bern and Canton Wallis at their western end. The tourist coming from the North leaves the broad Aare Valley of Canton Bern and its lakes at Thun, and ascends gradually through the lateral Kander Valley towards the glaciated chain of the Diablerets, Oldenhorn, Wildstrübel and Altels on the southern horizon. The characteristic group of snowy summits known as the Blümlis Alp closes in the south-eastern. The valley itself is bestrewn with gigantic remnants of old mountain-slips, now clad with fir-tree and a rich flora. At Kandersteg it narrows, long moraines fringe the mountains, and the driving-road is left for a a steep winding footpath which climbs the mountain-sides beneath the shade of densely-grown larch and fir. The main stream hurls over rocky escarp and raves in deep ravine. A sudden opening in the wood discloses the tributary stream of the Gastern, its grey cliffs, and tumbling waterfalls; surely one of the most picturesque glens in the Alps!

Immediately beyond this point of view, the path descends slightly for a short distance and bends round the base of a wooded hill, known as the *Stierenbergli*, before it once more rises to the mountain pasturage and châlets of the *Spital*. Here, the sound of cow-bells rings over a grassy river-flat, hemmed in east and west by mountain ridges, northward by a thick tongue of moraine. Only one steep, narrow passage defiles the northern rocks and marks the contact of the Altels range with the moraine tongue. A dammed-up lake basin, often dry in summer, lies on the other side of the moraine where the road leads to the cosily-sheltered Schwarenbach Inn. Three-quarters of an hour's farther walk on rocky shelving ground takes the tourist past the Daubensee to the height of the Gemmi Pass and the Hotel.

Such was the walk to the Gemmi before the avalanche occurred. Now the broad pasturage flat, the narrow defile above it to the Schwarenbach Inn, as well as several passages of the road below, especially the "Stierenbergli," lie beneath masses of ruin and disorder. Fir-slopes have been felled at one blow. Dismembered parts of cattle have been floated hither, thither, in the ice-stream. What makes it the sadder is that all had been in readiness on the Spital Alp for the departure of the herd-boys and cattle on the following day to their villages in Wallis.

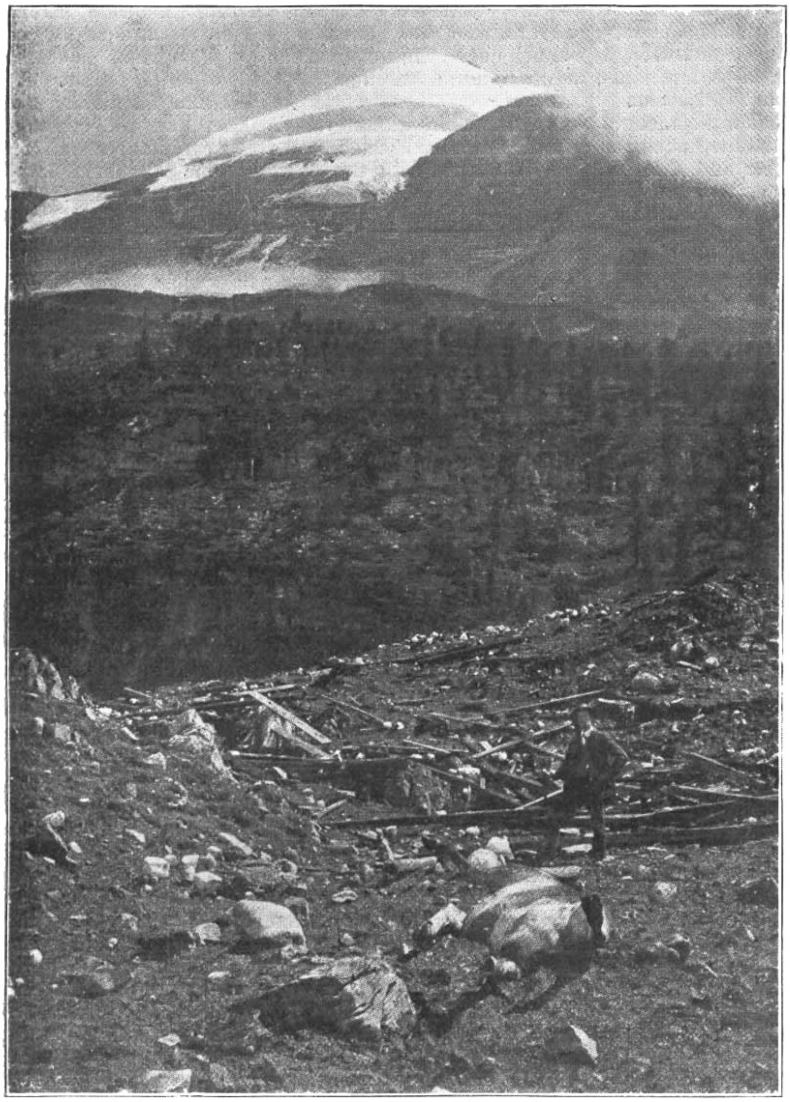

FIG. 1.—Ice-break on Altels Mountain.—Dead cow and fragments of châlet in the foreground.

Although the cause of the disaster was the fall of the ice-mass, it must not be forgotten that the actual destructive force is the wind-pressure ("Windschlag") in advance of the falling mass. Living things and timber are flailed to the ground, or borne to considerable distances. The mass of ice then buries all beneath tons of weight, and transports still farther, tearing and breaking whatever it carries.

The enormous rush of wind, together with the terrifying sounds of the avalanche, gave the people of the neighbourhood a rough awakening from their night's rest. They thought an earthquake was convulsing them. Only one witnessed the coming of the avalanche, that was the waitress at the Schwarenbach Inn, who had just risen to prepare an early cup of coffee for some of the guests. She rushed out, in time to see the ice skimming the road's corner on its way to destroy the Spital Alp. Had the fall taken place half a day sooner or later, tourists must inevitably have suffered on the much-frequented path.

Dr. Albert Heim, Professor of Geology at Zürich, was at once telegraphed for to make a thorough investigation of the disaster. The result of his examination will not be fully published until the end of the year. Meantime some of the more exact details may be stated here. The accompanying photographs are a few of those taken at Prof. Heim's wish immediately after the disaster.

The first shows the break in the ice on the Altels Mountain. It occurred near the foot of the nevé or "Firn-snow" region of the Altels glacier, at a height of 3300 metres (11,000 feet). The mass of ice which broke away measured about 300 metres in length, 200 metres in breath, and 30 metres in thickness. It streamed down the steep-dipping, smooth slabs of limestone rock on Altels, and spread itself out fan-like on the Spital Alp, 1900 metres high (6270 feet). The vertical height of the fall was therefore some 4700 feet. The immense impetus thus gained caused the ice to pursue its course up the steep incline of the "Oeschinen Grat." The main part in the centre of the avalanche "fan" dashed itself with its spray of ice-dust and débris against the ridge, surmounted it in parts as high as 2360 metres, over 7700 feet, and pitched many fragments upon different levels on the other, or Oeschinen Valley, side of the ridge. The outer wings of the fan, on the other hand, curved backwards; that on the north side can be traced as a return stream from Winteregg to the Stierenbergli corner of the Gemmi road referred to above (Fig. 2).

This return stream did especial damage to the trees; and nothing can be more striking than the sight of the long larch and fir trunks felled in one and the same direction, and clean-cut along a definite line. One hillock has been stripped of its timber on one side, while no harm has been done on the other. The course of the avalanche has left its trail of stems; up-torn roots, ravaged châlet, dead cattle, even cheeses may be distinguished jammed in the general heaps of ruin.

The result on the ice of its own motion and pressure during its fall deserves attention (Fig. 3). The photograph shows the typical form which the ice takes, viz. that of hard rounded pieces of ice of all sizes mixed in loose ice powder. Friction produces various markings on the rolled ice.

There is altogether a remarkably small proportion of carried *rock*-débris mixed with the ice. The whole field of ice on the Spital Alp simply portrays a "Staub Lawine," or dust avalanche on a large scale. In the course of a few years nature itself will have removed the last signs of a wreckage which at present hundreds of willing hands are doing their best to clear away in part from road and Alp.

MARIA M. OGILVIE.

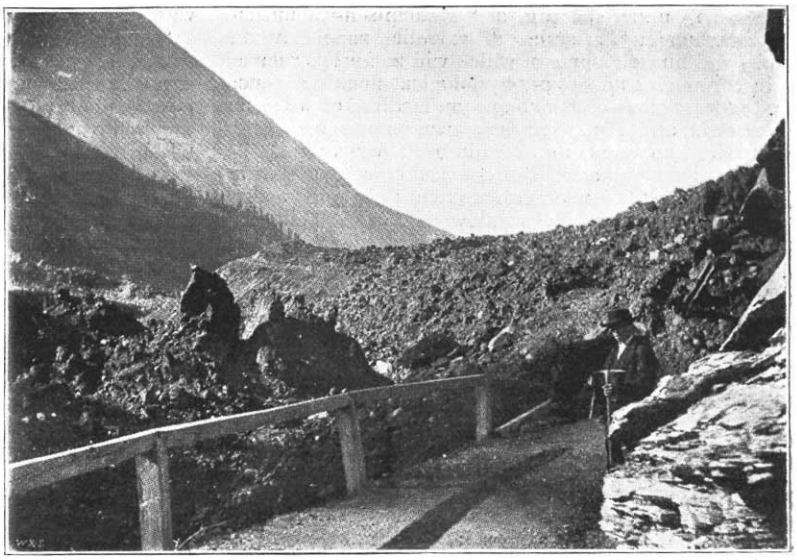

FIG. 2.—Return stream covering the Gemmi road at the Stierenbergli corner.

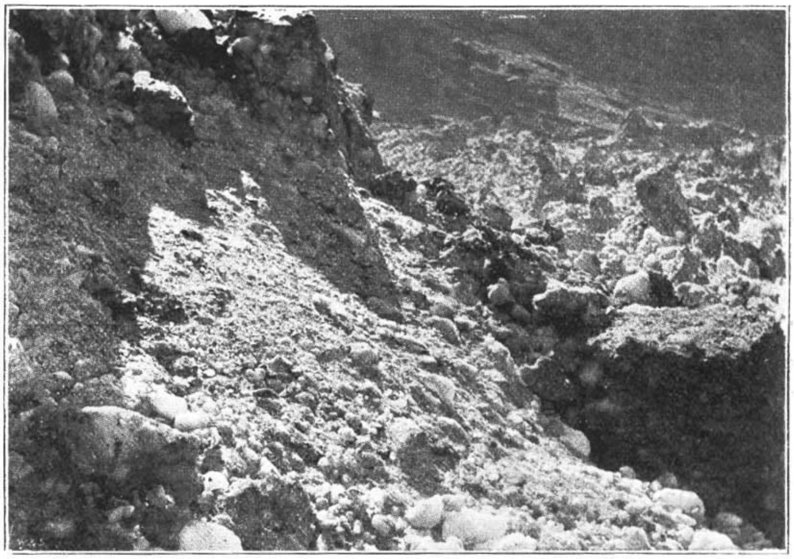

FIG. 3.—Ice structure in the avalanche.

THE LATE PROFESSOR HOPPE-SEYLER.[1]

ERNEST FELIX IMMANUEL HOPPE[2] was born in Freiburg on the Umstrut (Saxony) on December 26, 1825. At the age of nine he lost his mother, and at eleven, being left an orphan by the death of his father, he was taken charge of and educated by the governing body of an endowed institution in Halle. After the completion of his school course he commenced in 1846 the study of the natural sciences as a student of the University of Halle. Migrating early in his student's career to Leipzig, he had the good fortune to lay the foundations of his knowledge of anatomy and physiology under the three distinguished brothers Weber (Ernst Heinrich, Wilhelm and Eduard), to study chemistry under Erdmann, and under the eminent physiological chemist Karl Gotthold Lehmann, medicine under Oppolzer, surgery under Günther, and pathological anatomy under Bock. Hoppe spent the last two semesters of his student's course in Berlin, following the courses of Romberg, Langenbeck and Casper. He took the degree of Doctor of Medicine in 1850, presenting a dissertation "De cartilaginum structura et chondrino nonnulla," which he dedicated to his former master E. H. Weber, and which indicated the impulse he had received towards anatomical as well as chemical investigation, on the one hand through the influence of the Webers, on the other through that of K. G. Lehmann.

Having settled in medical practice in Berlin, Hoppe was appointed medical officer to the workhouse, and whilst occupying this post, devoted himself to researches, partly chemico-physiological and partly clinical. To the former class belong investigations on cartilage bone and tooth, as well as chemical analyses of certain so-called transudations; to the latter, studies of which the object was to discover the physical principles which underlie many of the phenomena revealed by the percussion and auscultation of the chest in disease. In 1856, Hoppe was appointed Prosector in the University of Greisswald, where he qualified as Privat-docent; here, however, he only remained until 1858, when he was recalled to Berlin by Virchow, in order to act as his assistant. Virchow had just been appointed the first ordinary professor of pathological anatomy in the University, and Hoppe, as his only assistant, was at first called upon to take a part in all the work of the Pathological Institute, whether anatomical or chemical. Very soon, however, he was enabled to confine his attention to researches in physiological and pathological chemistry, and to the superintendence of the chemical laboratory of the Insti-

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[1] Though some weeks have elapsed since the death of this eminent man of science, a brief account of his life and an attempt to convey some idea of the part which he played in the advancement of physiological chemistry may not prove uninteresting to the readers of NATURE. In the preparation of this paper I have been greatly assisted by the information contained in an article which appeared in the *Vossiche Zeitung* of August 12.—A. G.

[2] The subject of this notice changed his name from Hoppe to Hoppe-Seyler somewhere about the year 1862.